# Energy and Environmental Sciences

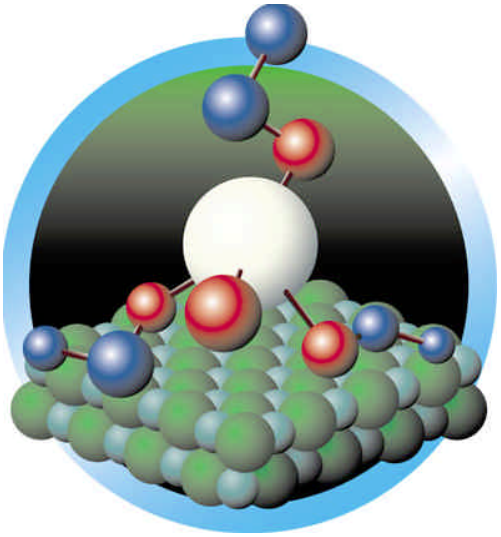
*Creating innovative, science-based technology and engineering solutions*

Idaho National Engineering and Environmental Laboratory

INEEL Home of Science and Engineering Solutions

### *Research Focus*

- **Geosciences Research** – improving our understanding of the coupled chemical, biological, and physical processes in the subsurface, and how these processes affect the transport of water and contaminants. Researchers are designing better remediation approaches, improving vadose zone and groundwater monitoring technologies, and advancing modeling capabilities to provide more realistic risk and performance assessments.
- **Applied Geosciences** – providing critical support for INEEL's Environmental Remediation and High Level Waste programs, Environmental Affairs, and numerous other site operations. Support includes regulatory site characterization and sampling services, flow and transport computer modeling and analyses of the effects of contaminant releases on human health and the environment.
- **Biotechnology** – specializing in solving problems on issues of national and international importance. Researchers have made unique contributions in areas of basic science, energy, environment, and national security. In addition to serving the needs of the federal government, INEEL Biotechnology personnel collaborate with both public and private sector colleagues in several areas including agriculture, chemical processing, energy, environmental restoration, forest products, and mining.



- **Chemistry** – advancing the science of surface analysis through new analytical methods, and developing novel synthetic materials for industrial applications. Areas of research include mass spectrometry, polymers and industrial separations science, supercritical fluids, theoretical chemistry and thermodynamics, specialty biomedical chemistry, and ion mobility spectrometry.

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- **Materials** – improving understanding of the relationships between processing and materials properties, and developing new characterization techniques for metals, ceramics, and composite materials. Areas of research include nanocomposite and particulate materials development, fracture mechanics, advanced ceramics, engineering, biocorrosion of metals utilizing new scanning probe microscopy techniques, and computational materials science.
- **Physics** – developing measurement systems, often with emphasis on hardened, non-contact sensors for field measurements, industrial process control, or in-situ use. Staff is active in plasma physics for materials processing and has extensive simulation capabilities. Specific disciplines include optical spectroscopy, nonlinear optics, nondestructive examination with acoustic and electromagnetic techniques, and fluid dynamics.
- **Prototype Shops** – developing instrument prototypes, experimental electronic instrumentation, and providing design consultation to INEEL scientists, engineers, and industry customers, for the development, assembly, and testing of one-of-a-kind items and mechanical and electronic system prototypes. Support includes design, machining, fabrication, modeling, assembly, design validation, and testing services.

- **Analytical Laboratory** – providing comprehensive analytical support for INEEL site cleanup and waste management activities. This includes organic, inorganic, and radiochemical laboratory services, Resource Conservation & Recovery Act and Department of Transportation sample certification, and chain-of-custody sample management.